NOTES.

PROF. SCHÄFER asks us to state that members of the British Association who have arranged to go to Toronto must take this year's membership ticket with them in order to secure the railway privileges available.

GRANTS amounting to ninety-five thousand marks (4750*l.*) were awarded for scientific purposes at the last meeting of the Berlin Academy of Sciences. Among these awards were the following:—2000 marks to Prof. Engler, Berlin, for the publication of monographs on African plants; 900 marks to Dr. G. Lindau, for his studies of lichens; 1500 marks to Prof. Frech, for his geological investigations; 850 marks to Prof. Hürthle, for his studies of muscle; 800 marks to Prof. R. Bonnet, for investigations of blood-vessels; 2000 marks to Dr. Lühe, for investigations of the fauna of salt lakes in French North Africa; 300 marks to Dr. G. Brandes, for the study of parasitic Nemertines in Messina; 500 marks to Dr. R. Hesse, for the investigation of eyes of lower marine animals, especially molluscs, at the Naples Zoological Station; 1500 marks to Prof. E. Cohen, for his researches on meteorites; 1500 marks to Dr. Ludwig Wulff, to continue his investigations on artificial crystals; 35,000 marks to Prof. F. E. Schulze, in support of the publication of "Das Tierreich," by the German Zoological Society.

UPON the outer wall of the Pasteur laboratory at the Ecole normale, Paris, a bronze medallion, reproducing with great truth the features of the great investigator, has just been placed. The medallion is the work of M. A. Patey, and it surmounts a slab of black marble bearing in letters of gold the following inscription:—

Ici fut le laboratoire de Pasteur.
1857.—Fermentations.
1860.—Générations spontanées.
1865.—Maladies des vins et des bières.
1868.—Maladies des vers à soie.
1881.—Virus et vaccins.
1885.—Prophylaxie de la rage.

This memorial was voted by the Municipal Council of Paris in December 1894 to commemorate the work done by Pasteur in the laboratory in the rue d'Ulm, now occupied by the École normale.

AN important change in the administration of the U.S. National Museum is announced in *Science*. Three sections have been organised—a section of anthropology, a section of biology and a section of geology, each having a head curator with an annual salary of 3500 dollars. Dr. W. H. Holmes has been appointed head curator of anthropology; Dr. Frederick W. True, head curator of biology; and Dr. George P. Merrill, head curator of geology. Dr. True and Dr. Merrill are already connected with the Museum, and it is expected that Dr. True will continue to act as the executive curator. Dr. Holmes, who leaves the Field Columbian Museum, Chicago, to accept this position, was formerly connected with the U.S. Geological Survey and the Bureau of Ethnology.

DR. ALFRED M. MAYER, professor of physics at the Stevens Institute of Technology since the foundation of that institute, died on July 13, aged sixty-one years. He was a Member of the National Academy of Sciences, and one of the original Fellows of the American Association for the Advancement of Science.

THE statue of Darwin that has been erected by the Shropshire Horticultural Society at the entrance to the Public Library and Museum, the former school buildings, of Shrewsbury, will, says *Natural Science*, be unveiled by Lord Kenyon, President of the Society, on August 10. The statue, which is of bronze on a granite pedestal, is the work of Mr. Horace Montford, of Shrewsbury, and is not wholly unlike the fine statue in the Natural History Museum, South Kensington.

THE Council of the British Institute of Preventive Medicine have appointed Dr. Allan Macfadyen Director of the Institute.

THE British Medical Association has awarded the Stewart Prize of 50*l.* to Dr. G. Sims Woodhead, and the Middlemore Prize of 50*l.* to Dr. Alexander Hill. Sir Walter Foster and Mr. C. G. Wheelhouse have been awarded the gold medals for distinguished merit.

CARBIDE of calcium not exceedingly 5 lbs. in quantity, when stored in separate, substantial, hermetically-closed metal vessels, containing not more than 1 lb. each, may now be kept without a licence, the Secretary of State having been advised that such small quantities might be safely exempted from the operation of the Order of Council of February 26, in which certain parts of the Petroleum Acts were applied to the substance.

THE preliminary programme of the sixteenth congress of the Sanitary Institute, to be held in Leeds, from September 14 to 18, has now been issued. The president of the congress is Dr. Robert Farquharson, M.P. The congress will include three general addresses and lectures. The sections will meet for two days each, and deal with (1) sanitary science and preventive medicine, presided over by Mr. T. Pridgin Teale, F.R.S.; (2) engineering and architecture, presided over by Mr. Lewis Angell; (3) chemistry, meteorology, and geology, presided over by Mr. William Whitaker, F.R.S. There will be six special conferences, the subjects and presidents of which will be "River Pollution," Major Lamorock Flower; "Municipal Representatives," Councillor B. Wormsley; "Medical Officers of Health," Dr. Edward Seaton; "Municipal and County Engineers," Mr. Thomas Hewson; "Sanitary Inspectors," Mr. Peter Fyfe; "Domestic Hygiene." In connection with the congress a health exhibition of apparatus and appliances relating to health and domestic use will be held. Excursions to places of interest in connection with sanitation will be arranged for those attending the congress. It appears from the programme that over three hundred authorities, including several County Councils, have already appointed delegates to the congress, and, as there are also over two thousand members and associates in the Institute, there will probably be a large attendance in addition to the local members of the congress.

AT a very numerously attended meeting of the Essex Field Club, held at Easton Lodge, near Dunmow, by the invitation of the Earl and Countess of Warwick, on Wednesday, July 21, a discussion was held for the consideration of practical methods for the protection of our native fauna and flora from the destruction and actual extermination which now threaten many interesting species. Mr. C. G. Barrett (hon. secretary to the Committee of the Entomological Society for the Protection of Insects in danger of extermination) opened the subject by a short address on "Insect protection: its necessity, means, and objects." Mr. J. E. Harting spoke with respect to birds and mammals; Prof. Boulger referred to the wholesale collecting which was exterminating many rare plants; and Prof. Meldola urged that children should be taught to respect the sacredness of life. The President, Mr. David Howard, strongly supported the pleas of the speakers, and Mr. W. Cole hinted at the injury that might be caused by legislative interference with the balance of nature. Eventually the following resolution of Prof. Boulger's was adopted unanimously, and the Club resolved to assist the scheme of the Entomological Society in every possible way: "That in view of the danger of extermination threatening many beautiful, rare and interesting plants, all lovers of nature should do their best to avoid this danger (*a*) by abstaining from wholesale collecting, collecting for merely individual private collections, needless rooting-up of specimens, attempting to cultivate wild specimens of refractory species, and purchasing such wild specimens from itinerant or other dealers; (*b*) by endeavouring to persuade others, especially school children, cottage gardeners, and dwellers in large towns, to a similar abstention." It is to be hoped that other local natural history societies will follow the example of the Essex Field Club, and bring this pressing matter prominently before their members.

THE first section of an interesting Russian expedition which was at work this spring, in Bukhara, under Colonel Kuznetsoff, has just returned to Tashkend. Although the Khanate of Bukhara is open to Europeans, and the Russian Turkestan Railway crosses it, the Khanate remains one of the least-known parts of Central Asia as regards its population and economical conditions. The new expedition had precisely these studies in view. It has visited the chief towns of Bukhara, as also the desert portion of the banks of the Amu for 190 miles, between Pata-ghissar and a lonely village Sarai, and has explored the region of Sarygor. It returns with valuable materials, and with a great number of photographs.

A SCIENTIFIC expedition was sent to Central Borneo, in 1893, by the Dutch Society for the advancement of natural history exploration in the Dutch colonies. Prof. Molengraaff went out as geologist, Dr. Hallier as botanist, and Dr. J. Büttikofer as zoologist, while Dr. Nieuwenhuis undertook the study of the anthropology and ethnography of the natives. A concise description of the field of exploration and a general statement of the zoological results is contributed to *Notes from the Leyden Museum* (vol. xix., published July 15) by Dr. J. Büttikofer. In the same publication, Dr. F. A. Jentink describes the mammals collected during the expedition.

THE most important matters which the Trustees of the South African Museum refer to in their report for the year 1896 are the reorganisation of the staff, and the completion of the new buildings recently described in NATURE (p. 31). The scientific staff of the Museum now stands as follows:—Mr. W. L. Sclater, Director and Keeper of the Department of Vertebrates; Mr. L. Peringuey, Assistant-Director and Keeper of the Department of Insects; Dr. W. F. Purcell, Assistant and Keeper of the Department of Land Invertebrates; Dr. G. S. Corstorphine, Keeper of the Department of Geology and Mineralogy; Dr. J. D. F. Gilchrist, Honorary Keeper of the Department of Marine Invertebrates. The total number of specimens added to the collections during the year was 8009, of which 900 species were new to the Museum. Evidence of increasing interest in the Museum is shown by the fact that the number of visitors in 1896 was 49,419, this being an increase of nearly eleven thousand upon the number of the previous year, and by far the highest number yet registered. Mr. Peringuey refers to the discovery, by Surgeon-Major Bruce, that the dreaded Tsetse-fly (*Glossina morsitans*) is a larviparous insect, *i.e.* it gives birth to a full-grown larva, which, very shortly after being extruded, pupates, the external skin or puparium hardening and assuming an ovate shape, auriculate at one end. This discovery, so much at variance with what is known of the life-history of kindred dipterous insects, was at first doubted, but Mr. Peringuey says he can authenticate it, for he has bred from puparia, sent to him by Sir Walter Hely-Hutchinson, the Governor of Natal, what is undoubtedly the *Glossina morsitans* of Westwood.

THE vast and sudden changes of wind-velocity occurring in stormy weather, which were revealed by Prof. Langley's observations published in 1893 in his essay on "The Internal Work of the Wind," have been made the subject of a novel investigation at the hands of Dr. Romei Martini. In the *Rendiconti del Reale Istituto Lombardo*, Dr. Martini describes a series of observations on the periodical and other variations in the level of water in wells, and has proved the existence of rapid fluctuations corresponding very closely with the fluctuations of wind-pressure during a storm, of which latter he also gives diagrams closely resembling Langley's. The old and well-known tradition, that a sudden rise or fall of water in wells may be used to predict bad weather, has thus received explanation; but the most remarkable feature is that while small and rapid fluctuations of pressure readily make their influence felt on the instrument for registering the level of the well, large variations in the barometer are much more uncertain in their action.

IN the *Monthly Weather Review*, considerable attention is now being given to kites and their use in exploring the upper air. The number in which the weather of April 1897 is discussed, contains a long monograph by Prof. C. F. Marvin dealing with the theory of the mechanics and stability of kites. In addition, the editor (Prof. Cleveland Abbe) gives some interesting historical facts relating to the early history of kites, and a controversy as to the earliest use of wire for kite-lines shows that experiments with wire were made in 1836 at Philadelphia, and in 1844 by Mr. Joshua Law in England. We also learn that just as the European meteorological bureaus have taken up sounding balloons as a means of exploration at great altitudes, the United States Weather Bureau has prepared kites to cover a great horizontal extent of territory with automatic meteorological instruments. While the European system is designed for special occasional work at 50,000 feet altitude, the American system of kites contemplates regular daily work at 5000 feet. Probably both systems will in time supplement each other.

THE current number of the *Zeitschrift für Hygiene* contains an elaborate memoir by Dr. Max Neisser, of the University of Breslau, on the correct diagnosis of diphtheria bacilli. Amongst the many interesting and important points investigated, considerable attention is directed to the production of acid in culture media by these bacilli. This has long been regarded as a characteristic feature in the growth of diphtheria bacilli; but Dr. Neisser has made a new departure in estimating the amount of acid elaborated, quantitatively. It appears that during the first nine hours no increase was observed, but at the end of the first day a considerable quantity was discovered, and that it materially increased in the course of the second day; after that period, however, no further rise was recorded. So far Dr. Neisser has only met with one variety of bacillus resembling that of diphtheria, which possesses this power of elaborating acids in such quantity. Some very interesting investigations are recorded on the rate of multiplication exhibited by diphtheria bacilli grown in serum, and then plate-cultivated in agar dishes for numerical determinations. The original number inoculated consisted of 1½ million diphtheria bacilli; after six hours this figure was transformed into 60 millions, after nine hours into 500 millions, and after twenty-four hours into 1100 millions. The growth in serum between the sixth and ninth hour after inoculation is, therefore, particularly prolific. In broth the multiplication is much slower, and at the end of twenty-four hours only about 120 millions of diphtheria bacilli were found, which, if contrasted with the 1100 millions recorded at the end of that time in blood-serum cultures, is very striking. Dr. Neisser's laborious investigations should prove of great value to all concerned in the bacterial diagnosis of diphtheria.

IN a recent number of the *Bulletin* of the Geological Society of America, Prof. Tarr describes some of the results of his study of the Greenland glaciers during the summer of 1896. In opposition to the views of other recent observers, he considers there is ample evidence of a former much greater extension of the ice. He points out that it is not safe to assume that a rugged peak has escaped ice-action, since there is plain evidence that certain peaks have been overwhelmed by the ice without losing their ruggedness. Two incidental discoveries given in this paper deserve special mention. One is the finding of recent marine shells in the boulder-clay of a moraine fifty feet above sea-level, and also in the ice itself of the glacier that had brought them there—a fact of great interest to British glacialists, in view of recent controversies. The second refers to the flora of a nunatak (Mount Schurman), regarded as but recently exposed above the ice: only light-seeded plants are said to have reached it as yet. A thorough study of the flora of nunataks would doubtless be as interesting as that of volcanic islands.

A VALUABLE paper has recently been published by Mr. C. S. Myers, giving "An account of some skulls discovered at Brandon, Suffolk" (*Journ. Anth. Inst.*, xxvi. p. 113). Brandon is the site of the famous flint quarries which are believed to have been worked continuously since the Neolithic period. In the vicinity are two Roman camps, and near by runs the Icknield Way, the great war- and trade-route of the Iceni in pre-Roman times. A few skulls resemble the "Neolithic" or "Long Barrow type." The skulls of brachycephalic series do not belong to the "Round Barrow type," which is quite unrepresented, but are to be allocated to a fairly widely-spread "Romano-British type." Among the elongated skulls Mr. Myers has proved the occurrence of the old "Row-Grave type" of Germany; it is a significant fact that about 372 A.D. the Alemannic Bucinobantes came from Mainz on the right bank of the Rhine, and appear to have settled, within twenty miles of Brandon, at Buckenham in Norfolk. Allied to these skulls is the long, low-crowned "Batavian type," which also occur at Brandon. Only one definitely Saxon skull was noted. The evidence points to the fact that the burial-ground whence these skulls were obtained was that of a people of mixed ethnic character belonging to a time antecedent to the Saxon Invasion; but it is probable that even then Saxon settlers were arriving in small numbers.

THE curious custom of trepanning—that is, of removing small pieces of bone from the living head—is very ancient and widely spread. In his recently-published book, "Prehistoric Problems," Dr. Munro has devoted a chapter to "Prehistoric trepanning and cranial amulets." About the same time, Drs. H. Malbot and R. Verneau published in *l'Anthropologie* (tome vii.) a memoir on the Chaouias and the trepanning of the skull in the Aurès. The Djebel-Aurès, "Mountains of the Cedars," form the south-east border of the Algerian plateau; here and in the neighbouring Djebel-Chechar is the centre of trepanning. The natives are carefully described; they belong to the Berber stem; a portion—perhaps one-eighth—are fair; thus the external, as well as the cranial, characters show them to be a somewhat mixed people. The method of trepanning is very fully described, and a native doctor showed Dr. Malbot a skull with over a dozen circular holes, two slits, and a large irregular orifice, all of which had been pierced when the man was alive! The skull, though taken from a grave, was kept hidden, and it evidently was used as an example by the local doctors. The enthusiastic French doctor says "the Chaouias respect their tombs, and on no pretext will rifle them; the love of science alone can explain this profanation on the part of our trepanner. It is the same sentiment which has led to our possession of the specimen." Dr. Malbot describes how he acquired the specimen which is now in the Museum d'histoire naturelle in Paris. The natives have recourse to trepanning for blows or wounds on the head; it does not matter how long before the blow may have been given, if only a sick person can remember that he has had one. The operation is by no means a severe one, as the people have a most remarkable recuperative constitution. A woman, tired of the conjugal yoke, has been known to call in the services of a trepanner in order to procure a divorce from her husband by producing a piece of her skull, which she affirmed had been broken by his ill-treatment.

THE useful services rendered by ladybirds in ridding fruit trees of insect pests were referred to in an article in NATURE of March 25 (vol. lv. p. 499). Further information upon the subject is given by Mr. C. L. Marlatt in the "Year-Book of the U.S. Department of Agriculture," in an article describing the various methods employed to combat the ravages of injurious insects in California, where the possibility of control of insects by introducing and fostering their natural enemies has been thoroughly tested. The very notable instance of the entire eradication of the white scale insect by the introduction from Australia of its ladybird enemy, *Vedalia cardinalis*, demonstrated the possibilities in this direction in the most striking way. This one experiment saved the State its citrus industry, and gave the greatest confidence in many quarters in this means of controlling insects, as well as incited the later action looking to the introduction of beneficial insects on a much larger scale. It led the State of California, in 1891, to grant 5000 dols. "for the purpose of sending an expert to Australia, New Zealand, and adjacent countries to collect and import into this State parasitic and predaceous insects." Mr. Albert Koebele, who had previously been instrumental in introducing *Vedalia cardinalis*, was selected for the work. His chief object was to obtain predaceous insects which might exterminate the black scale, the red scale, and the San José scale. Mr. Koebele's mission lasted upwards of a year, and during this time he imported into California probably 60,000 specimens, representing very many species, chiefly of ladybirds. Five or six of these species took hold well from the start, and two or three of them are still represented abundantly in the orchards of California, the others having practically disappeared. The important ones remaining include a very efficient predatory enemy of the black scale in the little *Rhizobius ventralis*, and two much smaller species, *R. debilis* and *R. toowoombœ*, which attack the black scale, and also the red scale and San José scale to a less extent. *Rhizobius ventralis* was easily colonised, and during the last three years has been distributed in enormous numbers to different parts of the State, 300,000 or 400,000 having been colonised in Southern California alone. This beetle is by far the most useful of the recent importations, and has already done much good; in several instances it has effected the entire eradication of the black scale in badly infested orchards. The disappearance of the scale may in some cases be due to other natural causes, but there seems to be no doubt that the chief credit belongs to the ladybirds. Once the ladybirds have established themselves in sufficient numbers, it seems best not to spray or fumigate the trees, as these treatments are very prejudical to the multiplication of this beneficial beetle.

ON Monday, August 2 (Bank Holiday), the Yorkshire Naturalists' Union will hold a meeting at Market Weighton, for the investigation of Everingham Park and surrounding woods and the low-lying Carr-land in the district.

WE have to acknowledge the receipt of "*Bulletin* No. 1 of the Free Museum of Science and Art, Department of Archæology and Palæontology, University of Pennsylvania." The object of the bulletin, which will be published four times a year, or as frequently as occasion may require, is the publication of new material acquired by the Museum, with accounts of explorations conducted by the Museum, and original investigations based upon its collections. The present issue contains articles by Dr. D. E. Brinton, entitled "The Pillars of Ben" and "The So-called 'Bow-Puller,'" besides brief notes on collections and publications.

THE following are among the papers and other publications which have come under our notice during the past few days:—"Life in Sewers," by Mr. H. A. Roechling, in the *Transactions* of the Leicester Literary and Philosophical Society (vol. iv. part iii., 1897). The paper is an instructive account of bacterial life found in the sewage itself and in sewer air, and the diseases produced by it.—A paper on the distribution and migration of Colorado birds, by Mr. W. W. Cooke, is published as *Bulletin* No. 37 of the State Agricultural College, Fort Collins, Colorado. The total number of species and varieties of birds which occur in Colorado is 360, of which 228 are known to breed. This is said to be a larger number of species than has been taken in any State east of the Mississippi, and is only exceeded by Nebraska with nearly four hundred species.—The tidal phenomena of the St. John River, New Brunswick, Canada, at low summer level, are described by Mr. A. Wilmer Duff in the *Bulletin* of the Natural History Society of New Brunswick (No. xv., 1897.) Dr. G. F. Matthew contributes to the same bulletin a long review of the scientific work of Dr. Abraham Gesner, the geologist.—The Pasteur Memorial Lecture delivered by Prof. Percy Frankland before the Chemical Society on March 25, and reported in NATURE at the time (vol. lv. p. 518), is printed in full in the July *Journal* of the Society, with an excellent portrait of Pasteur.

THE additions to the Zoological Society's Gardens during the past week include a Chacma Baboon (*Cynocephalus porcarius*) from South Africa, presented by Mr. W. H. Stather; a Brown Capuchin (*Cebus fatuellus*) from South America, presented by Mr. D. Mackintosh; a Harnessed Antelope (*Tragelaphus scriptus*, ♂) from West Africa, presented by Mr. R. B. Llewelyn, C.M.G.: a Vulpine Squirrel (*Sciurus vulpinus*) from North America, presented by Messrs. A. G. and R. Rawlins; a King Parrot (*Aprosmictus syanopygius*) from Australia, presented by Mrs. R. L. Turner; a Crowned Horned Lizard (*Phrynosoma coronatum*) from California, presented by Mr. C. H. Hastings; a Daudin's Tortoise (*Testudo daudini*) from the Aldabra Islands; a West African Python (*Python sebæ*) from West Africa, deposited; a King Vulture (*Gypagus papa*) from South America; a Bronze-winged Pigeon (*Phaps chalcoptera*) from Australia, purchased; a Peacock Pheasant (*Polyplectron chinquis*), bred in the Gardens.

OUR ASTRONOMICAL COLUMN.

NEW OBSERVATIONS OF VENUS.—During the first three months of the present year, Dr. Eduardo Fontseré, of the Observatory of the Royal Academy of Sciences, Barcelona, made a series of observations of the planet Venus with a refractor of 11 cm. belonging to that observatory. An account of these observations is briefly described in the current number of the *Astronomischen Nachrichten* (No. 3430), and is accompanied by numerous figures illustrating the different surface markings that were recorded. The colour of the planet was noted as being of a yellowish green tinge, the most brilliant regions of the disc being less coloured than the others. The polar regions were not found to resemble those on Mars. Attention was paid especially to the dark and light spots on the disc, which were at times very conspicuous. We cannot here enumerate the various differences of shade observed, but we may mention the most brilliant noticed, namely, that situated near the south pole, and forming the letter X by the crossing of two arcs of circles. Dr. Fontseré classifies the bright regions into two divisions: those which are, to all intents and purposes, permanent, but of a variable nature, increasing and decreasing in relative brightness between certain limits; and those which appear like white trails always inclined towards the equator, but never parallel to it. As in the observations of Trouvelot, large deformations of the terminator were distinctly noticed, but are attributed for the most part to irradiation. The extremities of the horns were also found to be sometimes prolonged into the non-illuminated portion of the disc. The observations during these three months have indicated that, relatively to the sun, Venus has not undergone any rotation except as regards the small libration, which was exactly equal to that which corresponded to the change of geocentric latitude. The above-mentioned observations form a valuable contribution to our present knowledge concerning the telescopic appearance and time of rotation of this planet.

THE YERKES OBSERVATORY.—In the June number of the *Astrophysical Journal*, Prof. Hale brings to a conclusion his series of articles on the Yerkes Observatory and Telescope. The concluding article is elaborately illustrated, showing the telescope and dome in various stages of construction, the frontispiece illustrating the stage reached on May 11 last. We notice that the dedication of the observatory will take place on October 1 next, and it is hoped "that European men of science who propose to attend the Toronto meeting of the British Association in August, may think it desirable to take part in the formal inauguration of the Yerkes Observatory. . . . It is planned to hold a series of informal conferences on astronomical and astrophysical subjects. . . . A cordial invitation is hereby extended to all men of science who may be willing to honour the observatory by their presence on this occasion."

RESOLVING POWER OF SPECTROSCOPES.—In this column, on May 20 (p. 62), we referred briefly to Prof. Wadsworth's investigations on the question of the theoretical resolving power of optical instruments, in which he distinguished between four different cases. In this work he obtained formulæ which gave the three different resolving powers, namely, (1) p (theoretical) for a wide slit and monochromatic radiations; (2) R (limiting) for an infinitely narrow slit, but for lines of finite width $\Delta\lambda$; and (3) P (practical) for a wide slit and non-monochromatic radiations ranging for each line over a small value $\Delta\lambda$. In the current number of the *Astrophysical Journal* (vol. vi. No. 1), he now publishes tables which he has prepared, giving the values of p, R and P for values of r, which gives the value of the theoretical resolution of the instrument for an infinitely narrow slit and infinitely narrow spectral lines. In these tables r ranges from 25,000 to 1,000,000, $\Delta\lambda$ from 0·01 to 1·00 tenth metres, s (linear width of slit) from 0·005 mm. to 0·3 mm, and Ψ (angular magnitude of collimator as viewed from slit) from 1/40 to 1/10. All the values are computed for $\lambda = 5500$ tenth metres, this being the mean wave-length of the brightest part of the visible spectrum. Prof. Wadsworth adds also a complete explanation of the use of these tables, and numerous important remarks.

THE HORIZONTAL GYROSCOPE.—Attempts have several times been made to eliminate the use of the horizon when employing a sextant on board ships, by adopting mechanical or other means of determining the horizontal or vertical. Among these may be mentioned the pendulum in a collimator devised by Colonel Goulier, the mercury siphon of M. Renouf, and other ingenious devices suggested by Lejeune, Cardan, &c. None of these seems, however, to have come into practical use, and the mariner is still using the sextant in its ordinary form. Another rather novel mode of determining the horizontal is described by M. Gaspari in the *Journal de Physique* (vol. vi. p. 229). This idea was proposed by Rear-Admiral Fleuriais, and from all accounts seems to be of practical use. It consists in making a small addition to an ordinary sextant by mounting in front of the telescope and behind the small mirror a horizontal gyroscope which contains on its upper part two small plano-convex lenses, equal in all respects, placed a distance apart equal to their focal length. On the plane faces of these lenses are engraved two lines parallel to the equator of the gyroscope, and this plane contains their optical centres. The gyroscope is given a motion of rotation from 80 to 100 turns a second under some conditions. The horizontal is obtained by observing the position of the *locus* of these lines as the lenses revolve. To describe the method of working, and give an idea of the theory of the instrument, would occupy too much space in this column. We may mention, however, that the instrument has been used both on land and sea, and the officer who made the experiments "est arrivé à etablir que l'appareil est definitivement devenu pratique." With a telescope magnifiying from 3 to 4 diameters an approximation of 2′ was obtained under ordinary conditions of observation, but generally greater accuracy than this was secured.